

## CLAIMS

What is claimed is:

- 1 1. A method for identifying a nucleotide, the method comprising the steps of:
- 2 (a) exposing a biological sample to a nucleic acid primer capable of hybridizing
- 3 with a nucleic acid and comprising a donor molecule;
- 4 (b) performing a primer extension reaction in the presence of a nucleotide
- 5 complementary to the target nucleotide and comprising an acceptor molecule capable
- 6 of interacting with said donor molecule to produce a detectable signal; and
- 7 (c) identifying the target nucleotide incorporated into said primer as a function of
- 8 said signal.
- 1 2. The method of claim 1, wherein said donor activates said acceptor to produce a
- 2 detectable signal.
- 1 3. The method of claim 2, wherein said signal is a photo-emitting signal.
- 1 4. The method of claim 1, wherein said extension reaction is performed in the
- 2 presence of at least two different nucleotides, each comprising a different acceptor
- 3 molecule.
- 1 5. The method of claim 1, wherein less than all the nucleotides complementary to
- 2 the target nucleotide comprise an acceptor.
- 1 6. The method of claim 4 wherein each acceptor molecule produces a distinct
- 2 signal.
- 1 7. The method of claim 1, wherein said signal is a fluorescent signal characteristic
- 2 of the donor-acceptor interaction.

3 8. The method of claim 1, wherein said donor and acceptor molecules comprise a  
4 fluorophore.

1 9. The method of claim 1, wherein said donor and acceptor molecules comprise a  
2 fluorescent dye.

1 10. The method of claim 9, wherein said fluorescent dye is selected from the group  
2 consisting of 6-carboxyfluorescein (FAM), 6-carboxy-X-rhodamine (REG), N<sub>1</sub>, N<sub>1</sub> N<sup>1</sup>, N<sup>1</sup>-  
3 tetramethyl-6-carboxyrhodamine (TAMARA), 6-carboxy-X-rhodamine (ROX),  
4 fluorescein, Cy5® or LightCycler-Red 640.

1 11. The method of claim 1 wherein said donor molecule further comprises 6-  
2 carboxyfluorescein (FAM).

1 12. The method of claim 11 wherein said acceptor molecule comprises ), 6-carboxy-  
2 X-rhodamine (ROX).

1 13. The method of claim 1 wherein said nucleotide is a chain-terminating nucleotide.

1 14. The method of claim 13 wherein said chain-terminating nucleotide is a dideoxy  
2 nucleotide.

1 15. The method of claim 13 wherein said chain-terminating nucleotide is a 2'3' '-  
2 dideoxy nucleotide triphosphates selected from the group consisting of ddATP, ddCTP,  
3 ddGTP, ddTTP and ddUTP.

1 16. The method of claim 1 wherein said nucleic acid is isolated from a biological  
2 sample selected from the group consisting of pus, semen, sputum, semen, saliva,  
3 cerebrospinal fluid, stool, urine, blood, biopsy tissue and lymph.

1 17. The method of claim 1 wherein said nucleic acid sample is obtained from stool.

1 18. The method of claim 1, wherein said target is a nucleic acid mutation.

1 19. The method of claim 15, wherein said mutation occurs in a gene selected from  
2 the group consisting of ras oncogenes, p53, dcc, apc, mcc and  $\beta$ -catenin.

1 20. A method for identifying a single nucleotide polymorphic variant, comprising the  
2 steps of:

3 exposing a sample to a first nucleic acid primer comprising a donor molecule,

4 wherein said primer is capable of hybridizing to a nucleic acid in said sample at a locus

5 immediately 5' to a single nucleotide polymorphic locus;

6 extending said primer in the presence of at least two nucleotides, each

7 comprising a different acceptor molecule capable of interacting with said donor

8 molecule to produce a detectable signal;

9 detecting said signal; and

10 identifying said one or more nucleic acids present at said polymorphic locus.

1 21. The method of claim 20, wherein said nucleotides are chain-terminating  
2 nucleotides.

1 22. The method of claims 1 or 17, wherein said biological sample is obtained from a  
2 pooled patient population.

1 23. The method of claim 22 wherein said pooled biological sample comprises a stool  
2 sample obtained from members of a patient population.

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